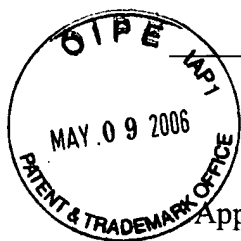


Please Direct All Correspondence to Customer Number **20995**

**APPEAL BRIEF**

Appellant : William Romine, et al.
App. No : 09/713,479
Filed : November 15, 2000
For : SYSTEM AND METHOD FOR
QUIESCING SELECT DATA
MODIFICATION OPERATIONS
AGAINST AN OBJECT OF A
DATABASE DURING ONE OR
MORE STRUCTURAL
OPERATIONS
Examiner : Debbie M. Lee
Art Unit : 2168
Confirmation No. : 3574

Express Mailing Certification

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(Date)

John R. King
John R. King, Reg. No. 34,362

Mail Stop Appeal Brief-Patents

Commissioner for Patents

P.O. Box 1450

Alexandria, Virginia 22313-1450

Dear Sir:

In accordance with the Notice of Appeal mailed on March 17, 2006, Appellant submits this Appeal Brief.

Appellant appeals the rejection of Claims 1-11, 19-25, 30, 32-37, 40, 41 and 49, which were rejected in the Final Office Action dated December 19, 2005, in the above-captioned patent application.

This Appeal Brief is being filed in accordance with the rules of 37 C.F.R. § 41.37 and includes a Claims Appendix, an Evidence Appendix, and a Related Proceedings Appendix.

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Docket No. : QSOF.T.050A
Application No. : 09/713,479
Filing Date : November 15, 2000

Appeal Brief
Customer No.: 20,995

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Docket No. : QSOFT.050A
Application No. : 09/713,479
Filing Date : November 15, 2000

Appeal Brief
Customer No.: 20,995

I. REAL PARTY IN INTEREST

The real party in interest is the assignee of record, Quest Software, Inc.

II. RELATED APPEALS AND INTERFERENCES

Both the present application and copending U.S. Patent Application No. 09/782,582 (Attorney Docket No. QSOFT.010A), filed February 12, 2001, claim priority benefit under 35 U.S.C. § 119(e) from U.S. Provisional Application No. 60/182,073, filed February 11, 2000, and entitled "SYSTEM AND METHOD FOR REORGANIZING A DATABASE."

U.S. Patent Application No. 09/782,582 was allowed by the Examiner after Appellant's mailing of an Appeal Brief on October 31, 2005. Thus, the Board did not render a decision relating to U.S. Patent Application No. 09/782,582.

III. STATUS OF CLAIMS

Claims 1-11, 19-25, 30, 32-37, 40, 41 and 49, as listed in the Claim Appendix, remain pending and are the subject of this Appeal.

Claims 12-18, 26-29, 31, 39 and 42-48 were previously cancelled.

On December 19, 2005, the Examiner finally rejected Claims 1-11, 19-25, 30, 32-38, 40, 41 and 49.

In an Amendment Accompanying Appellant's Appeal Brief filed concurrently herewith, Appellant cancels Claim 38.

IV. STATUS OF AMENDMENTS

As disclosed in Section III above and accompanying the present Appeal Brief, Appellant has filed an Amendment in accordance with 37 C.F.R. § 41.33(b)(1) in an effort to reduce the number of issues on appeal. In particular, the accompanying Amendment cancels Claim 38, which included minor errors.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The present application includes seven independent claims. Each independent claim is paraphrased below with citations to corresponding portions of the specification and drawings as required by 37 C.F.R. § 41.37(c)(1)(v).

These citations are provided in order to illustrate specific examples and embodiments of the recited claim language and not to limit or interpret the claims. Furthermore, a citation to a specific paragraph or appendix in the following claim summaries should be treated as a citation to all lines of that paragraph or appendix.

Claims 1, 19, 22, 30, 32, 35 and 40 are independent claims; however, before discussing each of the claims individually, Appellant has provided a brief overview.

Brief Overview

With reference to Figure 1, the claims of the subject application are directed to systems and methods for reorganizing an object (165), such as a table, in a database (115) while maintaining the availability of the object (165) to one or more clients (120). In particular, a

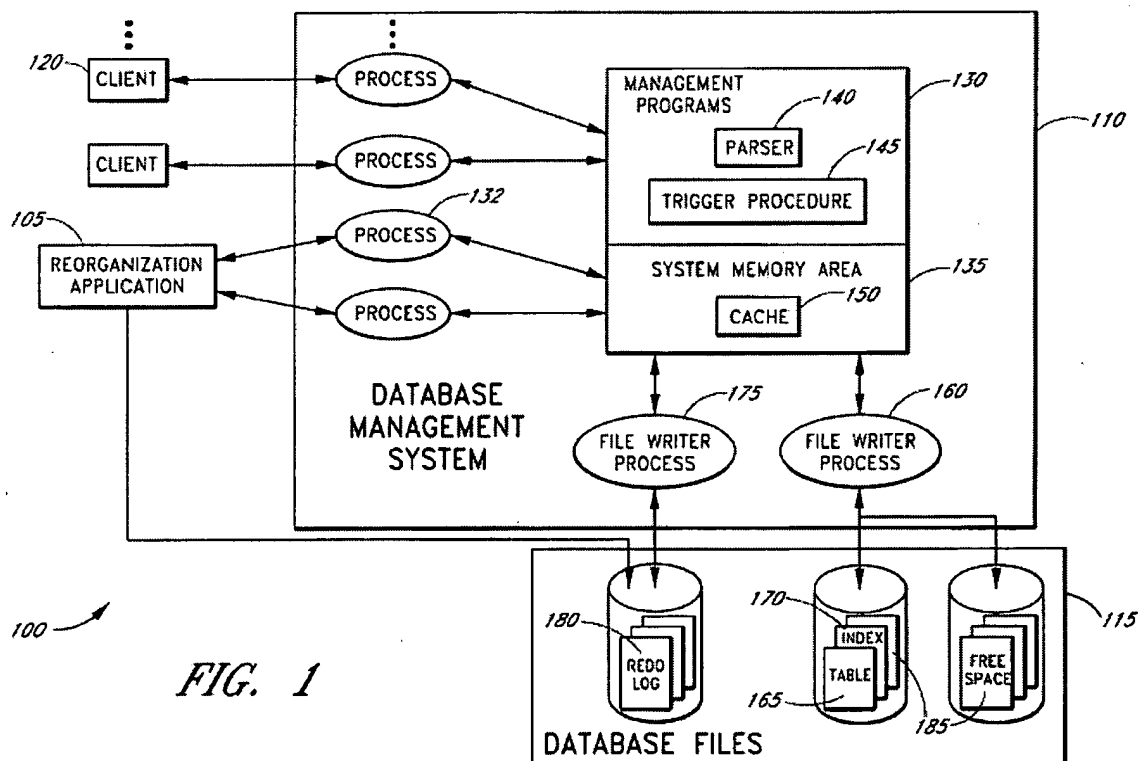


FIG. 1

reorganization application (105) communicates with a database management system ("DBMS") (110) to reorganize the object (165). In order to provide clients (120) of the database (115) with continuous access during reorganization to data stored in the object (165), the reorganization application (105) employs a trigger procedure (145) to create one or more partial locks, or trigger locks.

Trigger Locks

In certain claimed embodiments, multiple trigger locks are used by the reorganization system (100) during reorganization. Each trigger lock provides the reorganization application (105) a mechanism for blocking select data modification operations (e.g., "insert," "update" or "delete" operations) while allowing other operations (e.g., structural modification or read-only operations) against the particular object. For example, during certain reorganization processes, the reorganization application (105) applies a first trigger lock to the object (165) and a second trigger lock to the reorganized object.

Figure 4 illustrates a flowchart of a reorganization process (400) that utilizes two trigger locks and that may be performed by the reorganization system (100). In particular, the reorganization application (105) copies data from the original object (165) to the reorganized

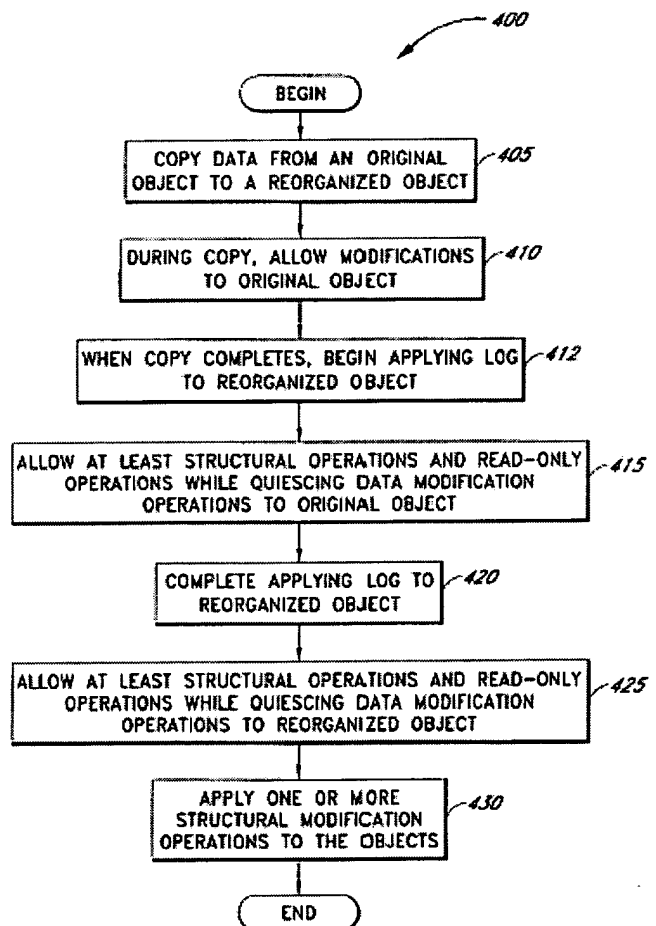


FIG. 4

object. Such copying may include accessing the DBMS (110) to remove chained rows and fragmentation from the data found in the original object (165) and/or may include resetting or reallocating at least some of the attributes (e.g., extent size or percent of free space in the data block) of the original object (165) in the reorganized object.

During the copying process, the clients (120) are allowed to access and modify the data of the original object (165). When the copying process completes, the reorganization application (105) accesses a redo log (180) to apply the modifications to the reorganized object. While applying these modifications, the reorganization application (105) also applies a trigger lock to the original object (165) that allows structural operations and/or read-only operations while quiescing data modification operations to the original object (165).

The reorganization application (105) finishes applying to the reorganized object the modifications stored in the redo log (180), which includes a list of the modifications to the original object (165) since the reorganization application (105) began applying modifications that occurred during the copying process. Through the application of the trigger lock to the original object (165), the reorganization application (105) is able to synchronize the reorganized object with the original object (165).

Once the reorganized object is synchronized with the original object (165), the reorganization application (105) applies a second trigger lock to the reorganized object. Like the trigger lock applied to the original object (165), the second trigger lock allows structural operations and/or read-only operations while quiescing data modification operations to the reorganized object.

The reorganization application (105) then renames the original object (165), such as to an archive-ready name, and renames the reorganized object to the name of the original object (165). After renaming the original and reorganized objects, the second trigger lock is then released from the reorganized object, now named the original object, thereby restoring full access by the clients (120) thereto. As a result, future access by the clients (120) to the original object (165) is applied by the DBMS (110) to the reorganized object.

Availability During Reorganization

The above-described reorganization process (400) advantageously provides continued read-only access and structural modification access to the clients (120) and the reorganization application (105) while synchronizing data between the original object (165) and the reorganized object. In particular, the use of two trigger locks enables continued client access to the stored data and to provide for synchronization between the object (165) and the reorganized object. Accordingly, the reorganization process (400) advantageously produces a reorganized object within a database that includes reduced fragmentations and the removal of at least some of the chained rows, thereby increasing overall database performance.

Independent Claim 1

Claim 1 is directed to a method of reorganizing a table in a database file while providing clients of the database file continuous access to data stored in the table. With reference to Figure 4, the method generally includes copying data from an original object to a reorganized object (405), allowing certain operations to be performed against the original object (415), applying modifications to the reorganized object (410, 420), allowing certain operations to be performed against the reorganized object (425), and substituting the reorganized object for the original object (430).

In particular, the method of Claim 1 comprises:

- reorganizing data of an original table by copying the data to a reorganized table (see, e.g., page 16, lines 5–7);
- during copying, allowing modifications to the data of the original table (see, e.g., page 16, lines 16–18) while collecting records of the modifications (see, e.g., page 16, lines 18–19);
- when the copying completes, applying the modifications from the collected records against the reorganized table (see, e.g., page 16, lines 19–22);
- applying a first partial lock to the original table (see, e.g., page 16, lines 27–29), the first partial lock blocking select data modification operations against the original

table while allowing other operations against the original table (see, e.g., page 16, lines 24–27);

- applying any remaining modifications from the collected records against the reorganized table (see, e.g., page 16, line 30 – page 17, line 1);
- applying a second partial lock to the reorganized table (see, e.g., page 17, lines 22–23) blocking select data modification operations against the reorganized table while allowing other operations against the reorganized table during reorganization (see, e.g., page 17, lines 19–22) such that the reorganized table remains continuously accessible during reorganization (see, e.g., page 18, lines 7–12);
- substituting the reorganized table for the original table (see, e.g., page 17, lines 25–30) such that the reorganized table remains accessible during the substitution (see, e.g., page 18, lines 7–12); and
- removing the second partial lock (see, e.g., page 18, lines 5–7), wherein additional more-restrictive locks to the original table are not needed during the method of reorganizing the original table, thereby providing clients of the original table continuous access to the data during the reorganization through at least the other operations allowed by the first partial lock (see, e.g., page 18, lines 7–12).

Independent Claim 19

Claim 19 is directed to a method of reorganizing an object in a database. The method comprises:

- reorganizing an original object by copying data from the original object to a reorganized object (see, e.g., page 16, lines 5–7);
- applying a first partial lock to the original object (see, e.g., page 16, lines 27–29), the first partial lock blocking data modification operations from modifying the original object while allowing other operations to access the original object, wherein additional more-restrictive locks to the original object are not needed during the method of reorganizing the original object table (see, e.g., page 16, lines 24–27),

thereby providing clients of the original object continuous access to the data during reorganization through at least the other operations allowed by the partial lock (see, e.g., page 18, lines 7–12);

- applying a second partial lock to the reorganized table (see, e.g., page 17, lines 22–23), the second partial lock blocking select data modification operations against the reorganized table while allowing other operations against the reorganized table during reorganization (see, e.g., page 17, lines 19–22); and
- substituting the reorganized object with the original object (see, e.g., page 17, lines 25–30) such that the reorganized object remains readable during the substitution (see, e.g., page 18, lines 7–12).

Independent Claim 22

Claim 22 is directed to a computer-implemented method of reorganizing an object in a database file. The method comprises:

- reorganizing an original object by copying data from the original object to a reorganized object (see, e.g., page 16, lines 5–7);
- applying a first partial lock to the original table (see, e.g., page 16, lines 27–29) blocking select data modification operations against the original table while allowing other operations against the original table (see, e.g., page 16, lines 24–27);
- applying a second partial lock to the reorganized object (see, e.g., page 17, lines 22–23) blocking data modification operations from modifying the reorganized object, while allowing other operations to access the reorganized object (see, e.g., page 17, lines 19–22), wherein the reorganized object remains accessible during reorganization (see, e.g., page 18, lines 7–12); and
- substituting the reorganized object with the original object (see, e.g., page 17, lines 25–30) such that the reorganized object remains readable during the substitution (see, e.g., page 18, lines 7–12).

Independent Claim 30

Claim 30 is directed to a reorganization system (100). The reorganization system (100) comprises:

- at least one database file (115) having a table of data (165, 505) and a log file (180);
- a database management system (110) communicating with the at least one database file (115), thereby governing the modification of the data in the table (165, 505) (see, e.g., page 10, lines 5–8); and
- a reorganization application (105) communicating with the database management system (110) to access the table (165, 505) and communicating with the database file (115) to access the log file (180) (see, e.g., page 10, lines 5–8), wherein the reorganization application (105) is configured:
 - to copy the data of the table (165) to a reorganized table (510) (see, e.g., page 16, lines 5–7),
 - to apply modifications from the log file (180) corresponding to modifications to the table (165, 505) during the copying of the data (see, e.g., page 16, lines 19–22),
 - and to substitute the reorganized table (510) for the table (165, 505), thereby reorganizing the data of the table (165, 505) (see, e.g., page 17, lines 25–30),
 - wherein the reorganization application (105) is further configured to apply a first partial lock (200) to the table (165, 505) (see, e.g., page 16, lines 27–29), thereby blocking select data modification language operations while allowing at least read-only operations, wherein additional more-restrictive locks to the table (165, 505) are not needed during reorganization of the table (165, 505), thereby providing clients (120) of the table (165, 505) access to the data during the reorganization through at least the other operations allowed by the first partial lock (200) (see, e.g., page 16, lines 24–27),

- and wherein the reorganization application (105) is further configured to apply a second partial lock (200) to the reorganized table (510) (see, e.g., page 17, lines 22–23), thereby blocking select data modification language operations while allowing at least read-only operations (see, e.g., page 17, lines 19–22),
- and wherein the reorganized table (510) remains readable when the reorganization application substitutes the reorganized table (510) for the table (165, 505) (see, e.g., page 18, lines 7–12).

Independent Claim 32

Claim 32 is directed to a reorganization application (105) for reorganizing an object (165, 505) in a database (115). The reorganization application (105) comprises an execution thread (600) that:

- reorganizes an original object (165, 505) by copying data of the original object (165, 505) to a reorganized object (510) (see, e.g., page 16, lines 5–7; see also 615 of Figure 6), and
- which applies a first partial lock (200) to the original object (165, 505) (see, e.g., page 16, lines 27–29; see also 635 of Figure 6), wherein the first partial lock (200) blocks data modification operations from modifying the original object (165, 505) while allowing other operations to access the original object (165, 505) thereby providing clients of the original object (165, 505) access to the data during reorganization through at least the other operations allowed by the first partial lock (200) (see, e.g., page 16, lines 24–27), and
- wherein a second partial lock (200) is applied to the reorganized object (510) (see, e.g., page 17, lines 22–23; see also 650 of Figure 6) such that the reorganized object (510) remains readable when substituting the reorganized object (510) for the original object (165, 505) (see, e.g., page 18, lines 7–12).

Independent Claim 35

Claim 35 is directed to a computer-implemented reorganization application (105) for reorganizing an object (165, 505) in a database (115). The computer-implemented reorganization application (105) comprises an execution thread (600) that:

- reorganizes an original object (165, 505) by copying data of the original object (165, 505) to a reorganized object (510) (see, e.g., page 16, lines 5–7; see also 615 of Figure 6), and
- which applies a first partial lock (200) to the original object (165, 505) (see, e.g., page 16, lines 27–29; see also 635 of Figure 6) and a second partial lock (200) to the reorganized object (510) (see, e.g., page 17, lines 22–23; see also 650 of Figure 6),
 - wherein the second partial lock (200) blocks data modification operations from modifying the reorganized object (510) while allowing other operations to access the reorganized object (510) (see, e.g., page 17, lines 19–22), and wherein the reorganized object (510) remains readable when substituting the reorganized object (510) for the original object (165, 505) (see, e.g., page 18, lines 7–12).

Independent Claim 40

Claim 40 is directed to a computer-implemented reorganization application (105) for reorganizing an object (165, 505) in a database (115). The computer-implemented reorganization application (105) comprises an execution thread (600) that:

- reorganizes an original object (165, 505) by copying data of the original object (165, 505) to a reorganized object (510) (see, e.g., page 16, lines 5–7; see also 615 of Figure 6); and
- substitutes the reorganized object (510) for the original object (165, 505) (see, e.g., page 17, lines 25–30),
- wherein the execution thread (600) applies a first partial lock (200) to the original object (165, 505) (see, e.g., page 16, lines 27–29) and a second partial lock (200) to

the reorganized object (510) (see, e.g., page 17, lines 22–23) that allows read-only access to the data during substitution of the reorganized object (510) for the original object while blocking other access to the data (see, e.g., page 17, lines 19–22) and wherein the reorganized object (510) remains continuously accessible during reorganization (see, e.g., page 18, lines 7–12).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The following rejections are to be reviewed on appeal:

1. The rejection of Claims 1, 3–7, 9–11, 19–23, 30, 32–36, 40 and 49 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,519,613 to Friske et al. (“the Friske patent”) in view of U.S. Patent No. 6,499,033 to Vagnozzi (“the Vagnozzi patent”); and
2. The rejection of Claims 2, 8, 21, 24, 25, 37, 38, 41 and 49 under 35 U.S.C. § 103(a) as being unpatentable over the Friske patent in view of the Vagnozzi patent and in further view of U.S. Patent No. 6,122,640 to Pereira (“the Pereira patent”).

VII. ARGUMENT

A. Rejection of Claims 1, 3–7, 9–11, 19–23, 30, 32–36, 40 and 49 under 35 U.S.C. § 103(a) in View of the Friske and Vagnozzi Patents

Claims 1, 3–7, 9–11, 19–23, 30, 32–36, 40 and 49 are not properly rejected under 35 U.S.C. § 103(a) because the Friske patent and the Vagnozzi patent do not teach or suggest every limitation of each rejected claim. Furthermore, Appellant respectfully submits that the Friske patent and the Vagnozzi patent are not properly combinable.

1. Independent Claim 1

Claim 1 is directed to a method of reorganizing a table in a database file while providing clients of the database file continuous access to data stored in the table.

The method of Claim 1 comprises reorganizing data of an original table by copying the data to a reorganized table. During the copying process, modifications are allowed to the data of the original table while records of the modifications are collected. When the copying

completes, the modifications from the collected records are applied against the reorganized table.

The method also includes applying a first partial lock, or trigger lock, to the original table. The first partial lock blocks select data modification operations while allowing other operations against the original table. Any remaining modifications from the collected records are also applied against the reorganized table.

The method further comprises applying a second partial lock to the reorganized table. The second partial lock blocks select data modification operations while allowing other operations against the reorganized table during the reorganization such that the reorganized table remains continuously accessible during the reorganization.

After the second partial lock is applied to the reorganized table, the reorganized table is substituted for the original table such that the reorganized table remains accessible during the substitution. After the substitution, the second partial lock is removed from the reorganization table. Additional more-restrictive locks to the original table are not needed during the reorganization of the original table, thereby providing clients of the original table continuous access to the data during reorganization through at least the other operations allowed by the first partial lock.

a. None of the Cited References Teach or Suggest Applying Two Partial Locks During a Reorganization Process

The method of reorganization of Claim 1 includes applying two partial locks: (1) a partial lock to the original table, and (2) a partial lock to the reorganized table. Neither the Friske patent, nor the Vagnozzi patent, nor a combination thereof, teaches or suggests applying a partial lock to an original table and a partial lock to a reorganized table.

The Examiner concedes on Page 4 of the December 15, 2005 Final Office Action that the Friske patent does not explicitly teach:

applying a first partial lock . . . blocking select data modification operations against the original table while allowing other operations against the original table [and] applying a second partial lock . . . blocking select data modification operations against the reorganized table while allowing other operations against the reorganized table during the reorganization.

Rather, the Examiner relies on the Vagnozzi patent as teaching these features. In particular, the Examiner states that the Vagnozzi patent (i.e., col. 15, lines 22–38) teaches locking a database “with a shared-lock (reader lock) . . . , [thus] allow[ing] any number of other retrieval operations on the table to process concurrently, while temporary [sic] locking out update operations.”

The Vagnozzi patent, however, appears to describe a process of selectively retrieving records in a database and not the reorganization of a table in a database. In particular, the Vagnozzi patent states that its database is locked against updates during minimal portions of a retrieval operation (see, e.g., col. 15, lines 22–25, 29–31 and 35–38). The Vagnozzi patent does not teach or suggest applying partial locks to database tables during reorganization. Moreover, the Vagnozzi patent does not teach or suggest the use of multiple partial locks on different tables.

On Page 15 of the December 19, 2005 Final Office Action, the Examiner responds to Appellant’s previous arguments relating to the Vagnozzi patent not teaching reorganization by stating:

Vagnozzi teaches “permits fields to be added to the database,” which means that the database structure has been changed by newly added fields into the database structure.

This citation by the Examiner (i.e., col. 2, lines 62–65), however, relates to a database structure described in a prior art reference distinguished by the Vagnozzi patent (see, e.g., col. 2, line 66 – col. 3, line 6). Furthermore, the phrase relied upon by the Examiner is taken out of context. Rather, the Vagnozzi patent’s description of the prior art reference reads as follows (with emphasis added):

Since, in Waisman et al., the data is stored at the bottom level of a B-tree, consecutively numbered records need not be physically stored together. This permits the use of variable length fields and permits fields to be added to the database without having to reorganize the database or make changes to the database management program that is used to access the data.

Thus, the prior art reference being described by Vagnozzi addresses the addition of information to a database in such a way as to avoid the need for reorganization.

In addition, Appellant was unable to find any portion of Vagnozzi that relates to reorganization and, in particular, applying two partial locks during a reorganization process.

b. None of the Cited References Teach or Suggest Keeping a Reorganized Table Accessible While Substituting the Reorganized Table for an Original Table

The method of reorganization of Claim 1 includes substituting a reorganized table for an original table such that the reorganized table remains accessible during the substitution. Neither the Friske patent, nor the Vagnozzi patent, nor a combination thereof, teaches or suggests such a limitation.

Rather, the Friske patent discloses the opposite. In particular, the Friske patent states that, while replacing an original data set with a reorganized data set, “neither the original nor the reorganized data is accessible” (see, e.g., col. 9, lines 16–19; see also the Abstract).

As discussed in more detail above, the Vagnozzi patent does not teach or suggest the reorganization of data, and there is no teaching or suggestion in the Vagnozzi patent of keeping a reorganized table accessible while substituting the reorganized table for an original table.

c. The Friske and Vagnozzi Patents Cannot Properly Be Combined

Section 2143 of the M.P.E.P. identifies three requirements for establishing prima facie obviousness:

First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

The Friske patent and the Vagnozzi patent do not meet these requirements for establishing prima facie obviousness. First, there is no suggestion or motivation to combine the Friske patent and the Vagnozzi patent to teach or suggest the method of reorganization recited in Claim 1. While the Friske patent is directed to the online reorganization of a database, the Vagnozzi patent relates to the “fast storage and retrieval of data from very large

databases using multiple retrieval keys and complex retrieval criteria” (see col. 1, lines 15–17). Although the Examiner suggests that it would have been obvious to combine the two references because the Vagnozzi patent suggests minimizing locking overhead in a database system (see, e.g., page 5 of December 19, 2005 Final Office Action), the “locking” overhead of the Vagnozzi patent relates to the retrieval of data records and not to reorganization.

Rather, it appears that the Examiner has impermissibly used hindsight derived from the teachings in the present application, and not the teachings of the prior art, to reject the claims. In re Dembiczak, 175 F.3d 994, 999 (Fed. Cir. 1999) (holding the Board impermissibly used hindsight in determining obviousness); see also, M.P.E.P. § 2145(X)(A). In Dembiczak, the Federal Circuit reiterated that a determination of obviousness cannot simply rely on the inventor’s disclosure as a “blueprint” without evidence of a suggestion, teaching or motivation in the prior art. Dembiczak, 175 F.3d 994, 999. Also, according to M.P.E.P. § 706.02(j), “[t]he teaching and suggestion to make the claimed combination and the reasonable expectation for success must both be found in the prior art and not based on applicant’s disclosure.”

Second, there must be a reasonable expectation of success. Because the Vagnozzi patent appears to have no relation to data maintaining accessibility during the reorganization of a database object, there does not appear to be any expectation of success that the locking of a database during a retrieval operation (Vagnozzi) when combined with the reorganization process of the Friske patent would address such a problem addressed by Appellant’s claimed invention.

Third, as detailed above, neither the Friske patent, nor the Vagnozzi patent, nor a combination thereof, teaches all the limitations of independent Claim 1. Thus, even when combined, the Friske patent and the Vagnozzi patent would not teach Appellant’s claimed invention.

d. Summary

Because the cited references are not properly combinable and, even if combined, do not teach or suggest each limitation of independent Claim 1, Appellant respectfully submits that Claim 1 is patentably distinguished over the cited references.

2. Claims 3–7, 9–11, 19–23, 30, 32–36, 40 and 49

The rejection of independent Claims 19, 22, 30, 32, 35 and 40 and dependent Claims 3–7, 9–11, 20, 21, 23, 33, 34, 36 and 49 is improper for the reasons as set forth with respect to the patentability of Claim 1 and because of the additional limitations recited therein. However, for the purposes of this Appeal, Claims 3–7, 9–11, 19–23, 30, 32–36, 40 and 49 stand or fall with Claim 1.

B. Rejection of Claims 2, 8, 21, 24, 25, 37, 41 and 49 under 35 U.S.C. § 103(a)

Claims 2, 8, 21, 24, 25, 37, 41 and 49 are not properly rejected under 35 U.S.C. § 103(a) because the Friske patent in view of the Vagnozzi patent and in further view of the Pereira patent do not teach or suggest every limitation of each rejected claim.

As an initial matter, Appellant desires to point out that Claims 2, 8, 21, 24, 25, 37, 41 and 49 all depend from independent claims that were rejected under 35 U.S.C. § 103(a) as being unpatentable over the Friske patent in view of the Vagnozzi patent. Thus, for the purposes of this Appeal, Claims 2, 8, 21, 24, 25, 37, 41 and 49 stand or fall together, and Appellant respectfully submits that the rejection of dependent Claims 2, 8, 21, 24, 25, 37, 41 and 49 is improper for the reasons as set forth above with respect to the patentability of independent Claim 1. In addition, as discussed in more detail below, the Pereira patent, either alone or in combination with the Friske patent and/or the Vagnozzi patent, does not teach or suggest every element of each of Claims 2, 8, 21, 24, 25, 37, 41 and 49.

1. The Pereira Patent Does Not Teach or Suggest Applying a Partial Lock to a Reorganized Object During a Reorganization Process

Claims 2, 8, 21, 24, 25, 37, 41 and 49 recite two partial locks: (1) a partial lock on the original object, and (2) a partial lock on the reorganized object. In a Final Office Action

mailed August 11, 2003, the Examiner conceded that the Pereira patent does not teach or suggest applying a partial lock to the reorganized object.

Rather, the Pereira patent discloses a reorganization process wherein first and second locks are both applied to the original object (see, e.g., Figure 1, item 115 and 155; col. 7, lines 20–25 (disclosing the first lock); and col. 12, lines 44–67 (disclosing the second or “final” lock on the source table)). In particular, the second lock completely locks all access to the original, or source, table (see, e.g., col. 12, lines 43–45 and 55–56 (disclosing the final lock as killing active client sessions or waiting until all client sessions are closed)).

In contrast, Claims 2, 8, 21, 24, 25, 37, 41 and 49 recite a first partial lock applied to the original object and a second partial lock applied to the reorganized object. As described above, such a use of two partial locks may advantageously provide for continued client access to the stored data and for synchronization between the object and the reorganized object. The Pereira patent’s disclosed use of two locks on a single table does not allow for such continued access.

2. The Pereira Patent Does Not Teach or Suggest Keeping a Reorganized Table Accessible While Substituting the Reorganized Table for an Original Table

Claims 2, 8, 21, 24, 25, 37, 41 and 49 recite substituting a reorganized table for an original table such that the reorganized table remains accessible during the substitution. The Pereira patent does not teach or suggest such a limitation.

Rather, the Pereira patent discloses the opposite. In particular, the Pereira patent teaches that the reorganized table is not available to users until after substitution for the original table (i.e., renaming of reorganized table) (see, e.g., col. 12, lines 65–67). Furthermore, during this substitution process, it appears that the original table is also unavailable (i.e., switching of tables does not occur until active client sessions are killed or until pending user transactions are terminated) (see, e.g., col. 12, lines 55–60).

3. Summary

Because the Friske, Vagnozzi and Pereira patents are not properly combinable and, even if combined, do not teach or suggest every limitation of each of dependent Claims 2, 8, 21,

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24, 25, 37, 41 and 49, Appellant respectfully submits that Claims 2, 8, 21, 24, 25, 37, 41 and 49 are patentably distinguished over the cited references.

C. Conclusion

In view of the foregoing arguments distinguishing Claims 1-11, 19-25, 30, 32-37, 40, 41 and 49 over the art of record, Appellant respectfully requests that the rejections of these claims be reversed.

Please charge any additional fees, including any fees for additional extensions of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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VIII. CLAIMS APPENDIX

1. A method of reorganizing a table in a database file while providing clients of the database file continuous access to data stored in the table, the method comprising:

reorganizing data of an original table by copying the data to a reorganized table;

during the copying, allowing modifications to the data of the original table while collecting records of the modifications;

when the copying completes, applying the modifications from the collected records against the reorganized table;

applying a first partial lock to the original table, the first partial lock blocking select data modification operations against the original table while allowing other operations against the original table;

applying any remaining modifications from the collected records against the reorganized table;

applying a second partial lock to the reorganized table, the second partial lock blocking select data modification operations against the reorganized table while allowing other operations against the reorganized table during the reorganization such that the reorganized table remains continuously accessible during the reorganization;

substituting the reorganized table for the original table such that the reorganized table remains accessible while substituting the reorganized table for the original table; and

removing the second partial lock, wherein additional more-restrictive locks to the original table are not needed during the method of reorganizing the original table, thereby providing clients of the original table continuous access to the data during the reorganization through at least the other operations allowed by the first partial lock.

2. The method of Claim 1, wherein the other operations allowed by at least one of the first and second partial locks comprises one or more structural modification operations.

3. The method of Claim 1, wherein the other operations allowed by at least one of the first and second partial locks comprises one or more read-only operations.

4. The method of Claim 1, further comprising:

during the application of the modifications from the collected records against the reorganized table, allowing additional modifications to the data of the original table while collecting additional records of the additional modifications; and

when the modifications and at least portions of the additional modifications have been applied against the reorganized table, applying the first partial lock to the original table;

wherein the step of applying any remaining modifications includes applying any remaining modifications or additional modifications against the reorganized table.

5. The method of Claim 1, wherein when the original table included one or more relational constraints, the method further comprises applying at least one of the one or more relational constraints to the reorganized table.

6. The method of Claim 5, wherein the application of the at least one relational constraint to the reorganized table includes applying a trigger procedure to the reorganized table.

7. The method of Claim 5, wherein the application of the at least one relational constraint to the reorganized table includes applying a partial lock to another table.

8. The method of Claim 1, wherein the original table includes a table name, and wherein the step of substituting the reorganized table for the original table further comprises renaming the original table another name and naming the reorganized table the table name.

9. The method of Claim 1, further comprising archiving the original table.

10. The method of Claim 1, wherein the copying of the data of the original table to the reorganized table further comprises creating an original synchronization point, after which the records of modifications are collected.

11. The method of Claim 1, wherein before the application of the second partial lock, the original table and the reorganized table are in synchronization with one another.

12.-18. (Cancelled).

19. A method of reorganizing an object in a database, the method comprising:

reorganizing an original object by copying data from the original object to a reorganized object;

applying a first partial lock to the original object, the first partial lock blocking data modification operations from modifying the original object while allowing other operations to access the original object, wherein additional more-restrictive locks to the original object are not needed during the method of reorganizing the original object, thereby providing clients of the original object continuous access to the data during the reorganization through at least the other operations allowed by the partial lock;

applying a second partial lock to the reorganized table, the second partial lock blocking select data modification operations against the reorganized table while allowing other operations against the reorganized table during the reorganization; and

substituting the reorganized object with the original object such that the reorganized object remains readable while substituting the reorganized object for the original object.

20. The method of Claim 19, wherein the other operations include one or more read-only operations.

21. The method of Claim 19, wherein the other operations include one or more structural modification operations.

22. A computer-implemented method of reorganizing an object in a database file, the method comprising:

reorganizing an original object by copying data from the original object to a reorganized object;

applying a first partial lock to the original table, the first partial lock blocking select data modification operations against the original table while allowing other operations against the original table;

applying a second partial lock to the reorganized object, the second partial lock blocking data modification operations from modifying the reorganized object, while allowing other operations to access the reorganized object, wherein the reorganized object remains accessible during reorganization; and

substituting the reorganized object with the original object such that the reorganized object remains readable while substituting the reorganized object for the original object.

23. The method of Claim 22, wherein the other operations include one or more read-only operations.

24. The method of Claim 22, wherein the other operations include one or more structural modification operations.

25. The method of Claim 22, wherein the one or more structural modification operations include consecutive data definition language operations.

26.-29. (Cancelled).

30. A reorganization system, comprising:

at least one database file having a table of data and a log file;

a database management system communicating with the at least one database file, thereby governing the modification of the data in the table; and

a reorganization application communicating with the database management system to access the table and communicating with the database file to access the log file, wherein the reorganization application is configured to copy the data of the table to a reorganized table, to apply modifications from the log file corresponding to modifications to the table during the copying of the data, and to substitute the reorganized table for the table, thereby reorganizing the data of the table, wherein the reorganization application is further configured to apply a first partial lock to the

table, thereby blocking select data modification language operations while allowing at least read-only operations, wherein additional more-restrictive locks to the table are not needed during reorganization of the table, thereby providing clients of the table access to the data during the reorganization through at least the other operations allowed by the first partial lock, and wherein the reorganization application is further configured to apply a second partial lock to the reorganized table, thereby blocking select data modification language operations while allowing at least read-only operations and wherein the reorganized table remains readable when the reorganization application substitutes the reorganized table for the table.

31. (Cancelled).

32. A reorganization application for reorganizing an object in a database, the reorganization application comprising an execution thread which reorganizes an original object by copying data of the original object to a reorganized object, and which applies a first partial lock to the original object, wherein the first partial lock blocks data modification operations from modifying the original object while allowing other operations to access the original object thereby providing clients of the original object access to the data during the reorganization through at least the other operations allowed by the first partial lock, and wherein a second partial lock is applied to the reorganized object such that the reorganized object remains readable when substituting the reorganized object for the original object.

33. The reorganization application of Claim 32, wherein the other operations include one or more read-only operations.

34. The reorganization application of Claim 32, wherein the other operations include one or more structural modification operations.

35. A computer-implemented reorganization application for reorganizing an object in a database, the reorganization application comprising an execution thread which reorganizes an original object by copying data of the original object to a reorganized object, and which applies a first partial lock to the original object and a second partial

lock to the reorganized object, wherein the second partial lock blocks data modification operations from modifying the reorganized object while allowing other operations to access the reorganized object, and wherein the reorganized object remains readable when substituting the reorganized object for the original object.

36. The reorganization application of Claim 35, wherein the other operations include one or more read-only operations.

37. The reorganization application of Claim 35, wherein the other operations include one or more structural modification operations.

38. (Cancelled).

39. (Cancelled).

40. A computer-implemented reorganization application for reorganizing an object in a database, the reorganization application comprising an execution thread which reorganizes an original object by copying data of the original object to a reorganized object and which substitutes the reorganized object for the original object, wherein the execution thread applies a first partial lock to the original object and a second partial lock to the reorganized object that allows read-only access to the data during the substitution of the reorganized object for the original object while blocking other access to the data and wherein the reorganized object remains continuously accessible during reorganization.

41. The reorganization application of Claim 40, wherein the read-only access to the data includes read-only access during multiple data definition language operations.

42.-48 (Cancelled).

49. The reorganization system of Claim 30, wherein the second partial lock blocks select data modification language operations while allowing one of one or more read-only operations and one or more data definition language operations.

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IX. EVIDENCE APPENDIX

None.

X. RELATED PROCEEDINGS APPENDIX

None.